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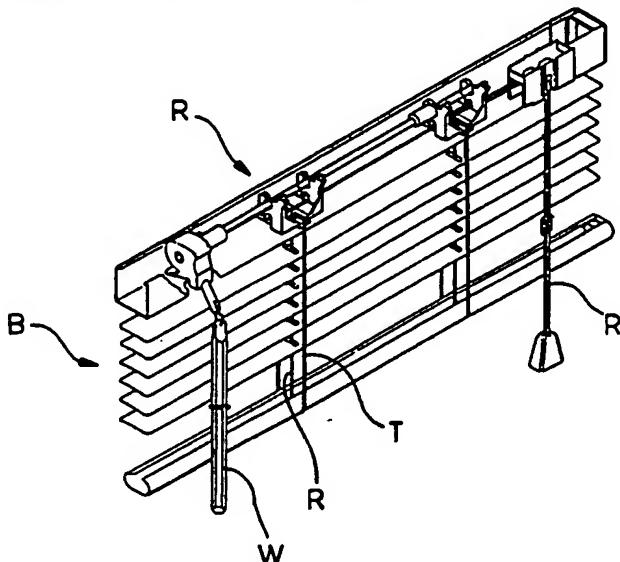


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(57) Abstract

Apparatus for the manufacture of blinds of the type having a head rail, a plurality of ladder tapes, a plurality of blind slats, and raise cords passing through the blind slats, by which the blind slats may be drawn upwardly toward the head rail, and wherein the apparatus has a die support for passage of strip material (S1, S2, S3) along an axis therealong for the formation of blind slats, a plurality of die units (48-58) mounted on the die support, at least some of said die units being movable therealong, the die units being aligned with one another along the strip path, the die units being operable to procure their selective operation to form openings in the strip material at preselected spaced points, a cut-off die (74) for cutting off a preselected length of the strip material to form a blind slat, slat threaders located downstream of the dies within for threading (130-140) a slat through the ladder tapes, and the threaders being moveable laterally relative to the axis of the strip material, and apparatus for the manufacture of blind components such as headrails (R) for such blinds wherein end stops are linked together for axial movement along the length of such a head rail, and a method of manufacturing blinds and blind components using such apparatus.



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(54) **Method and Apparatus for the Manufacture of Blinds**

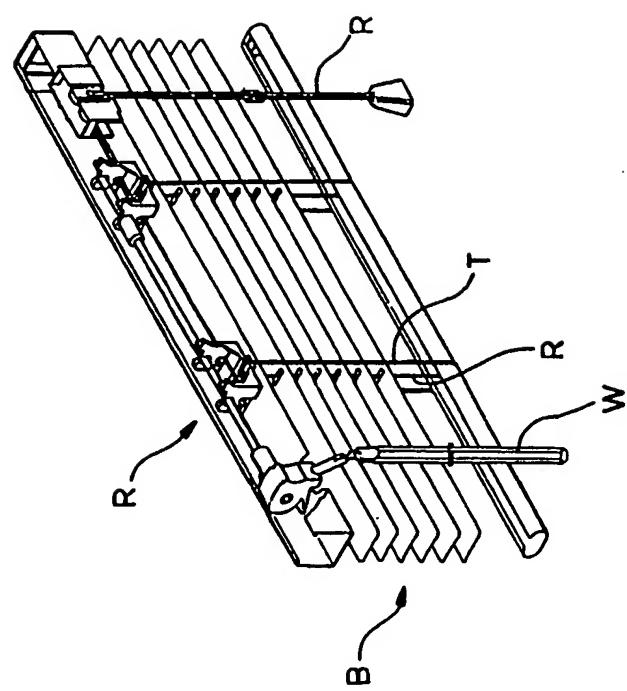
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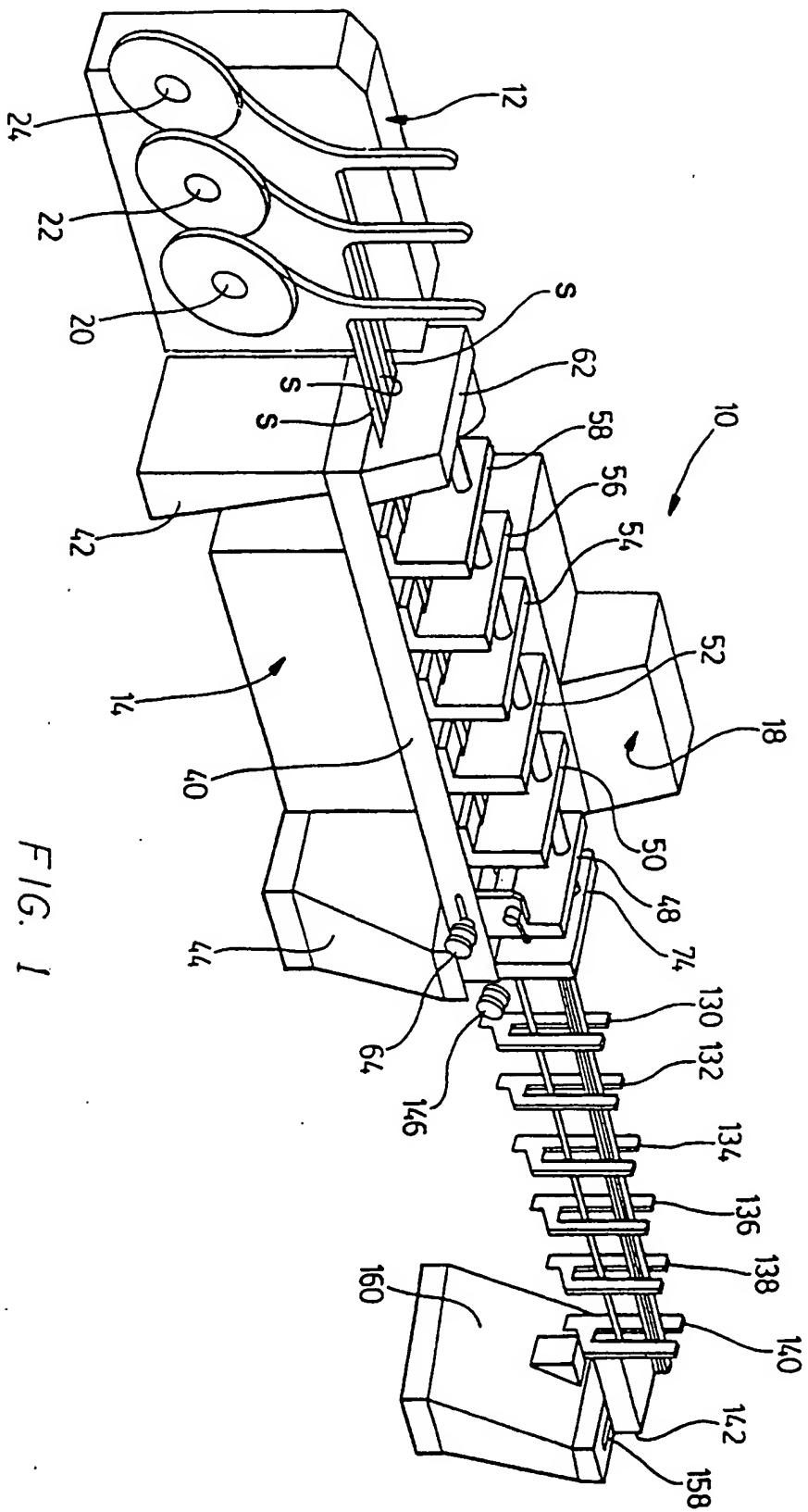
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(57) **28 Claims**





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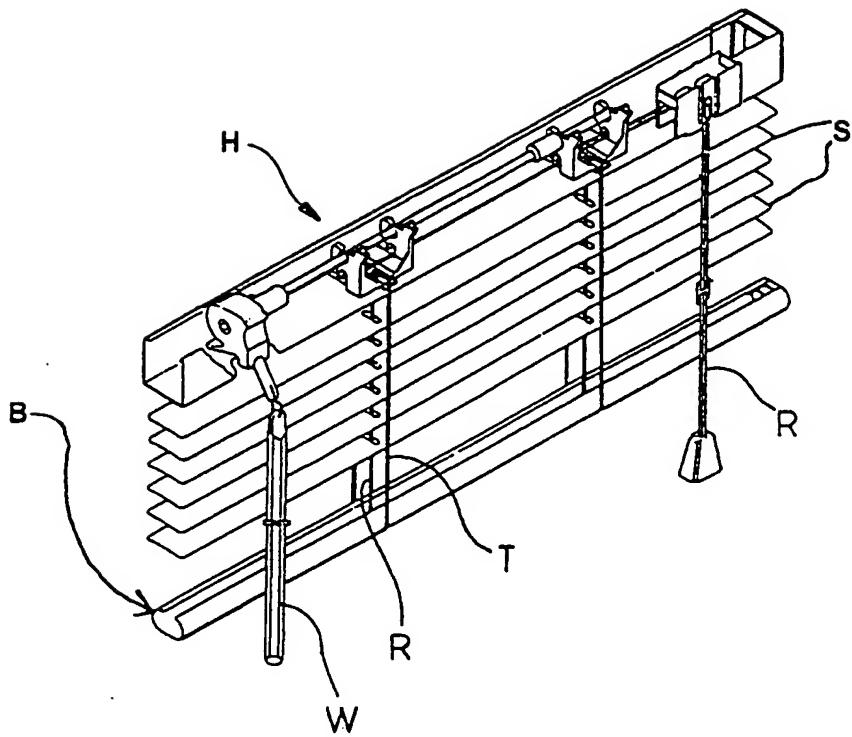


FIG. 2

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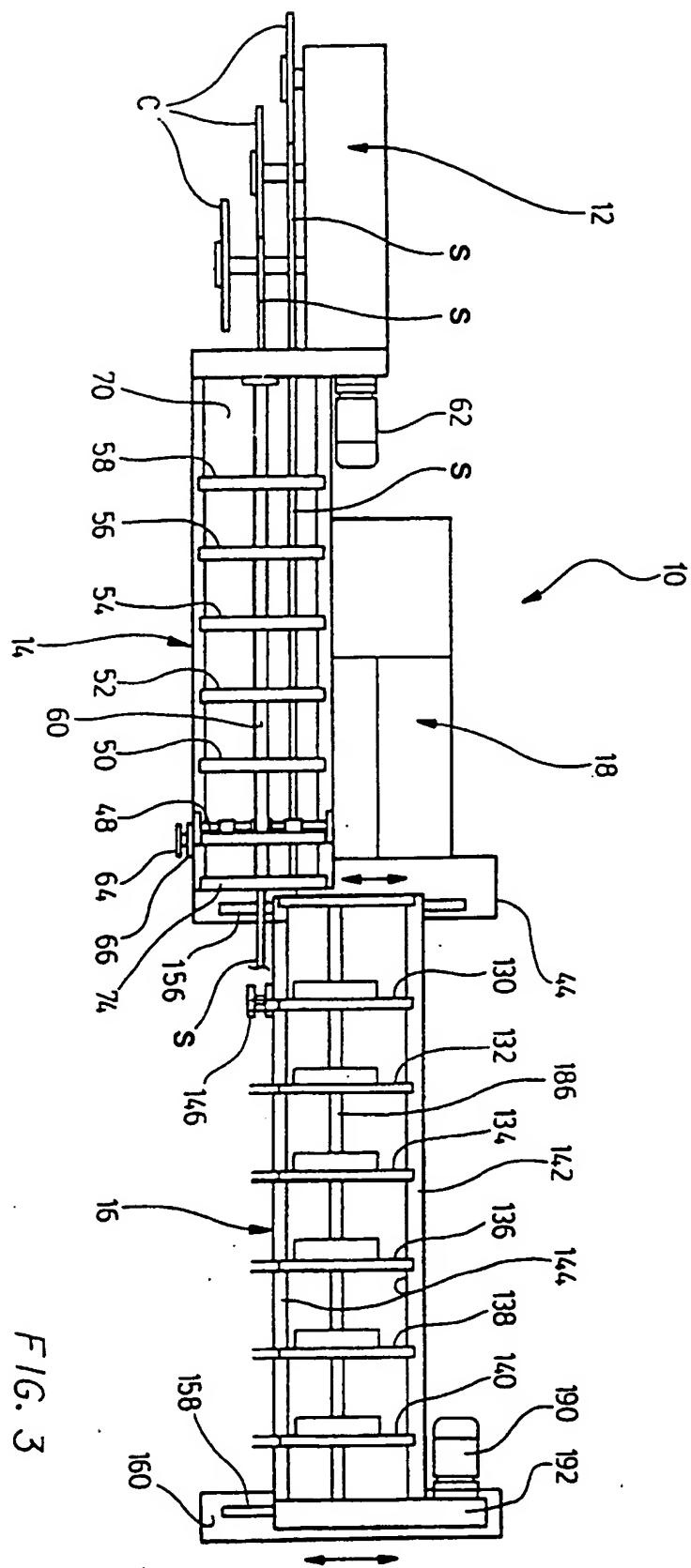


FIG. 3

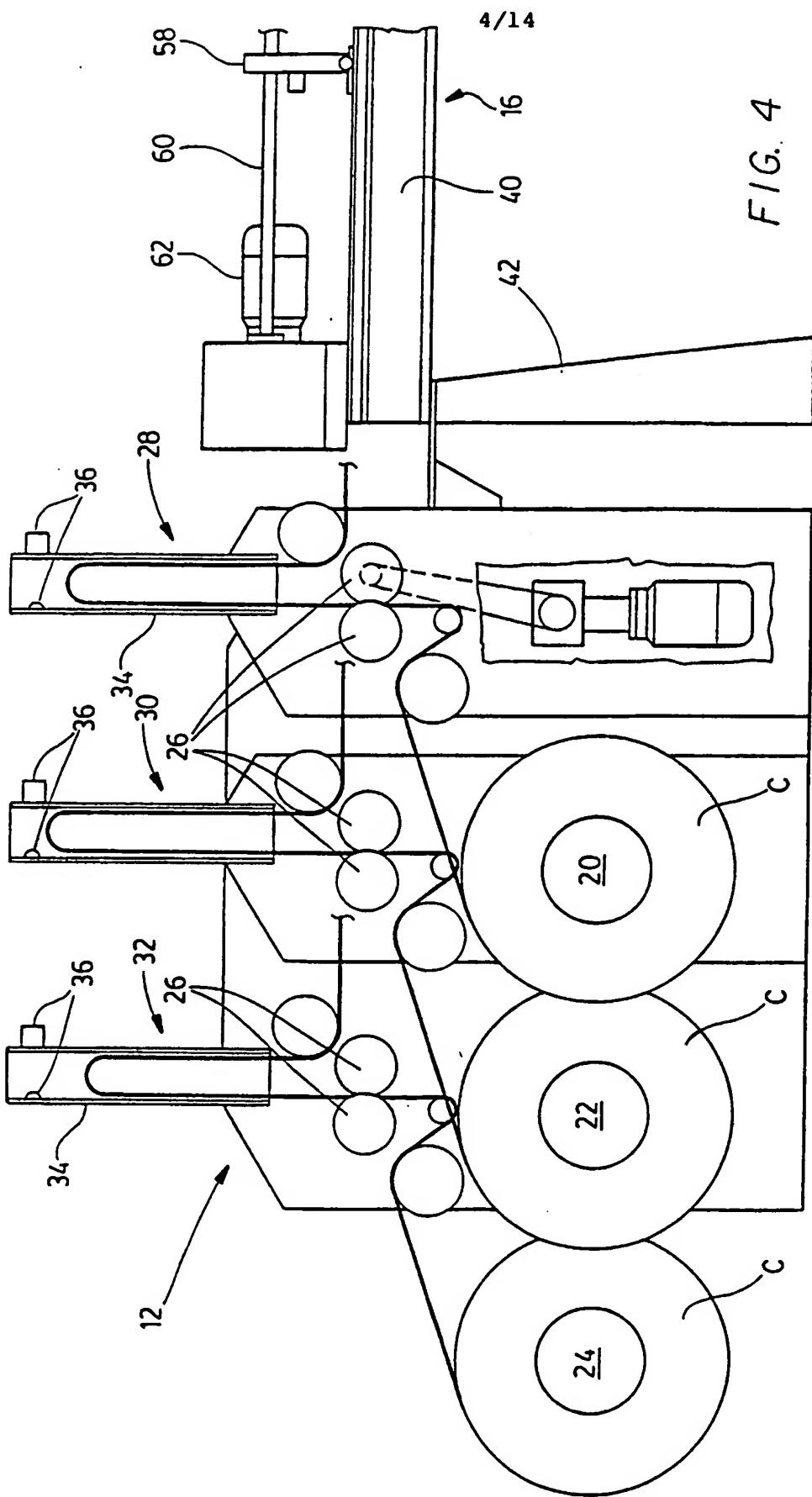


FIG. 4

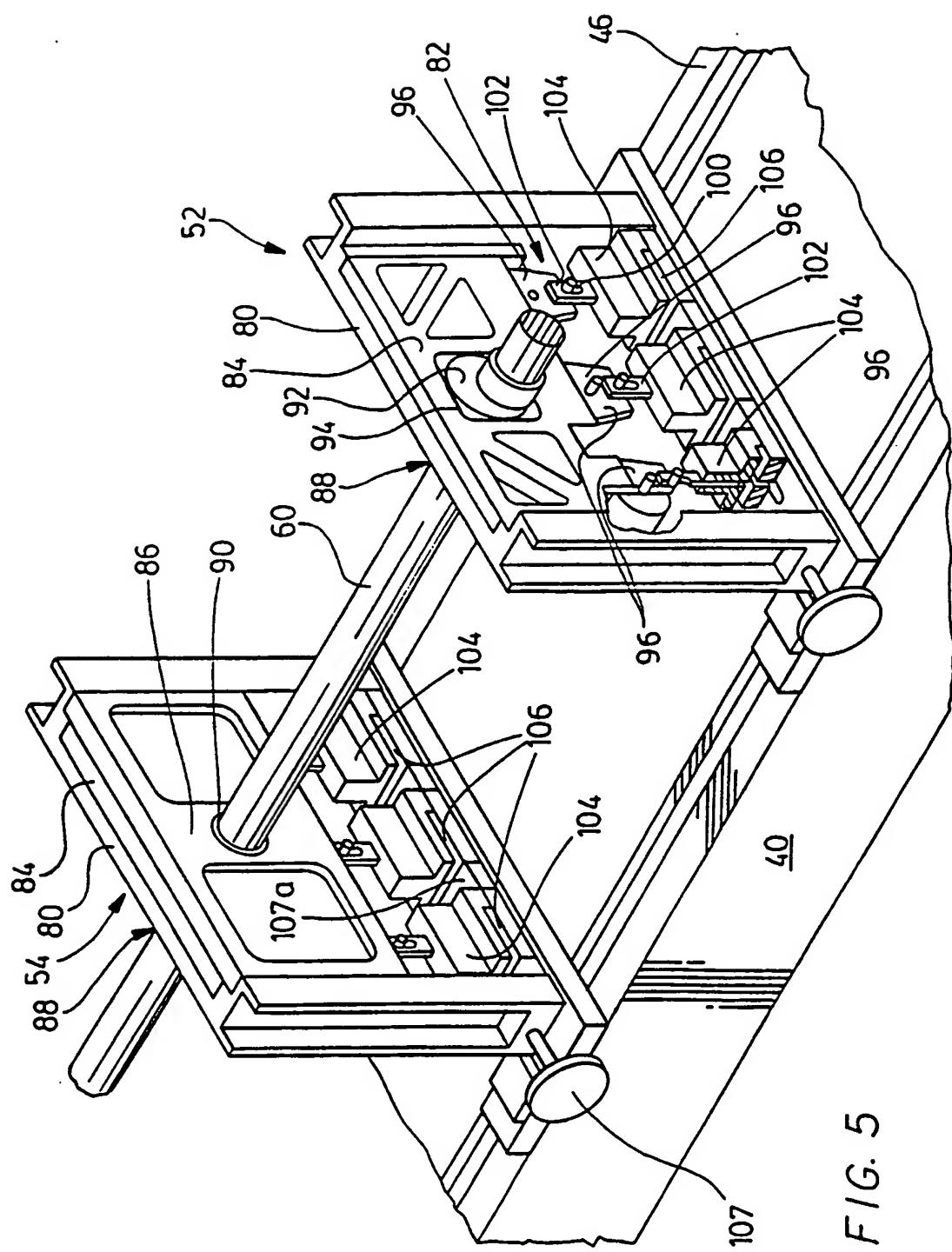


FIG. 5

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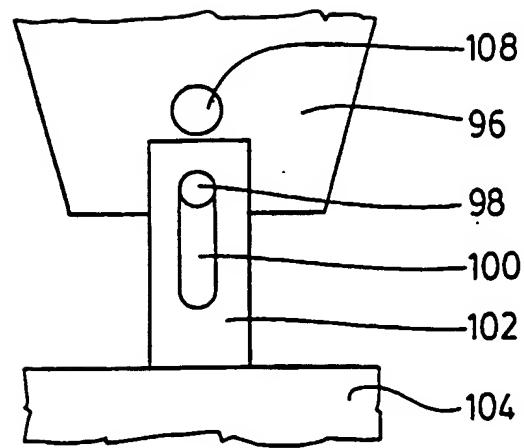


FIG. 6

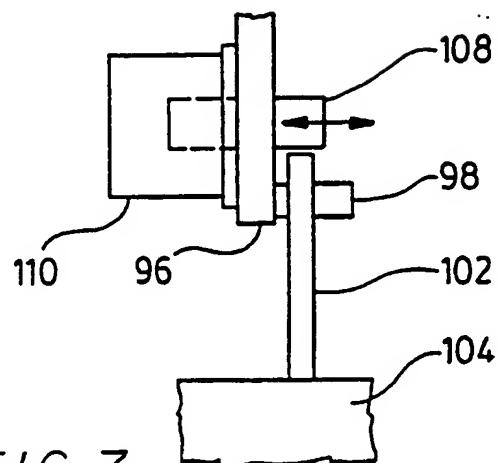


FIG. 7

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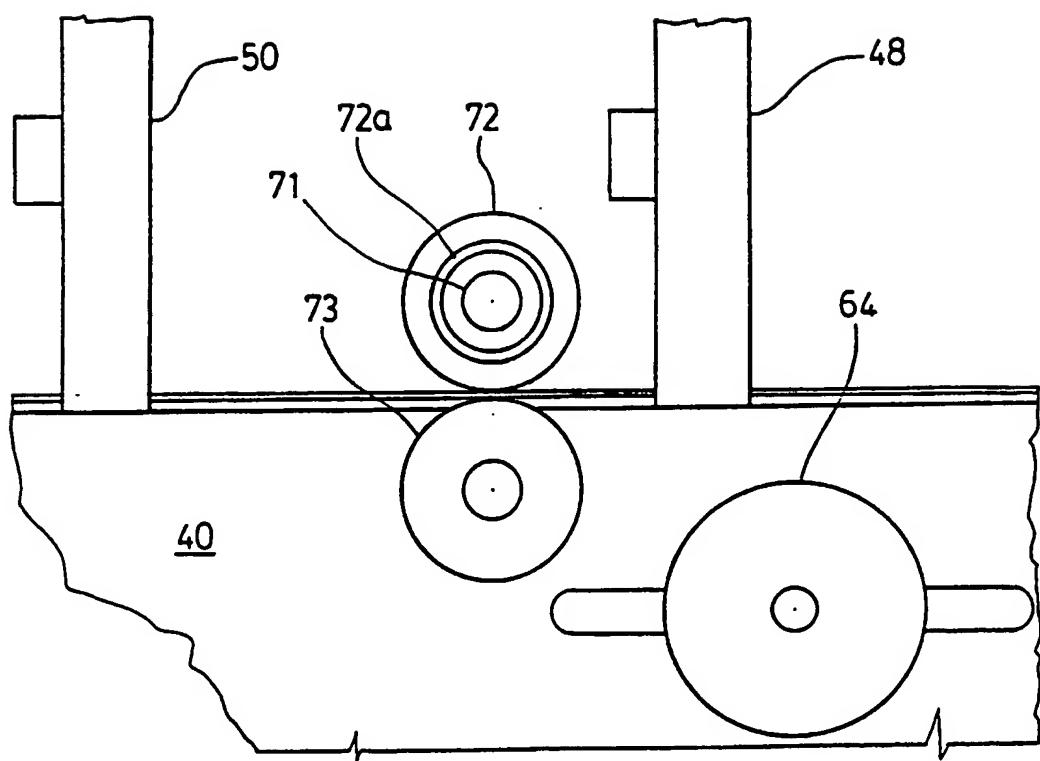
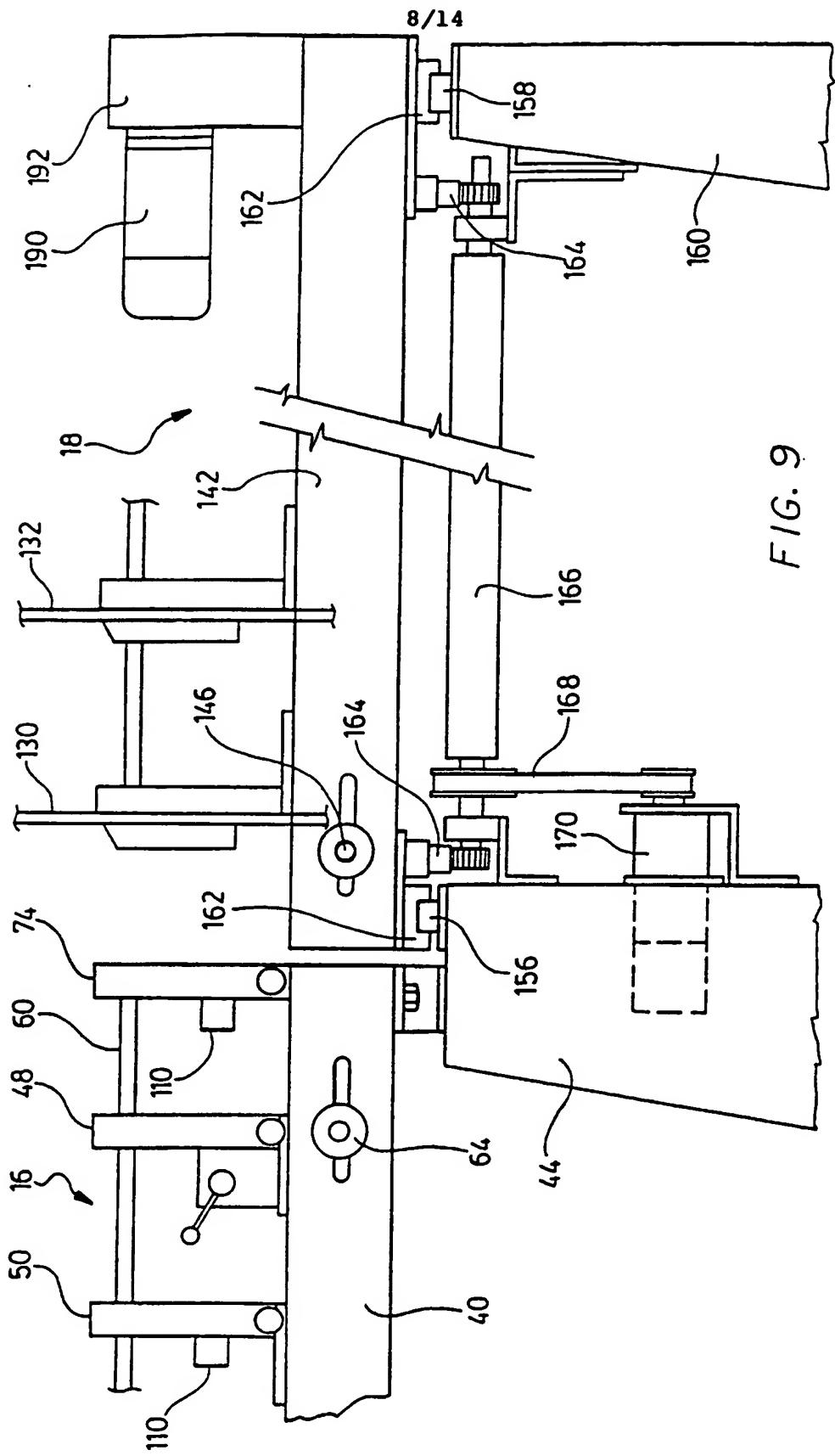


FIG. 8



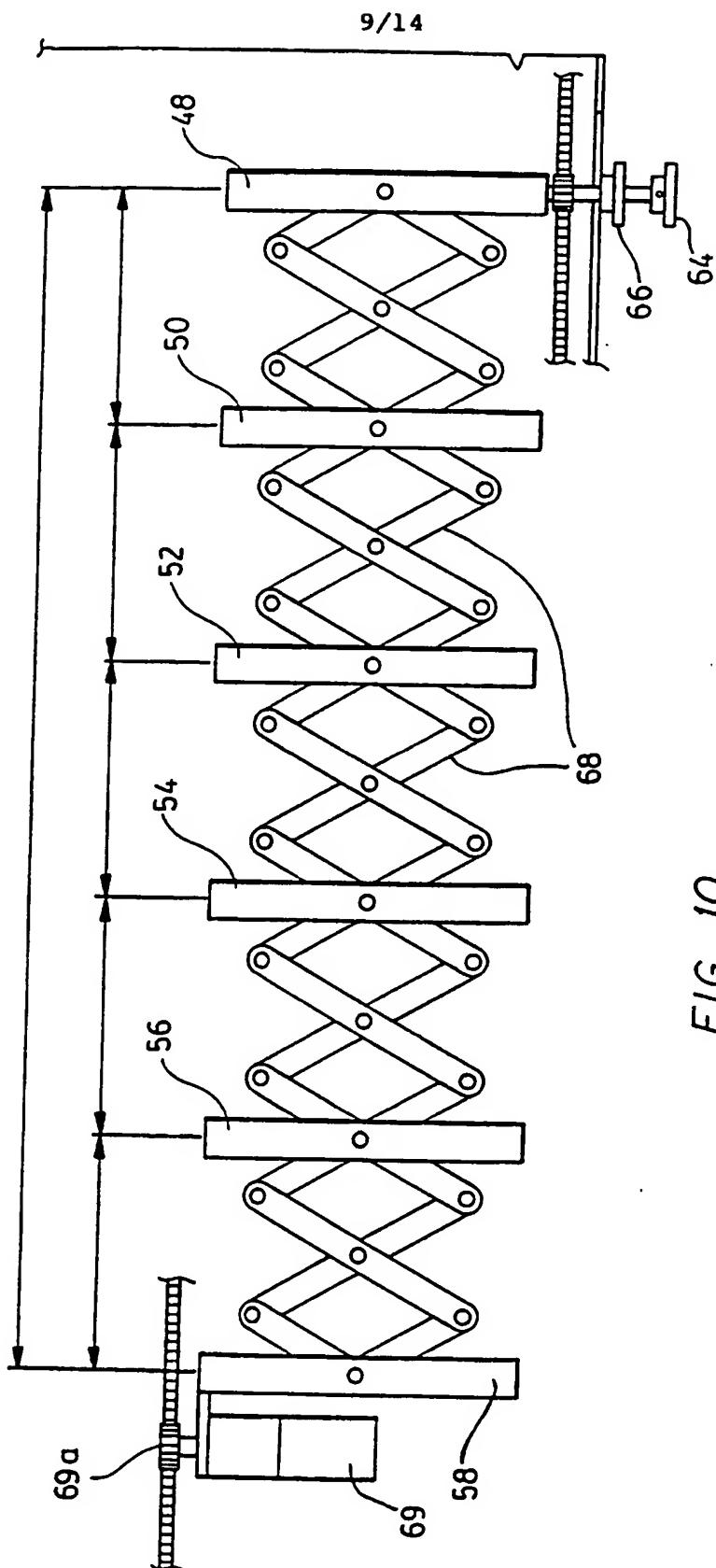


FIG. 10

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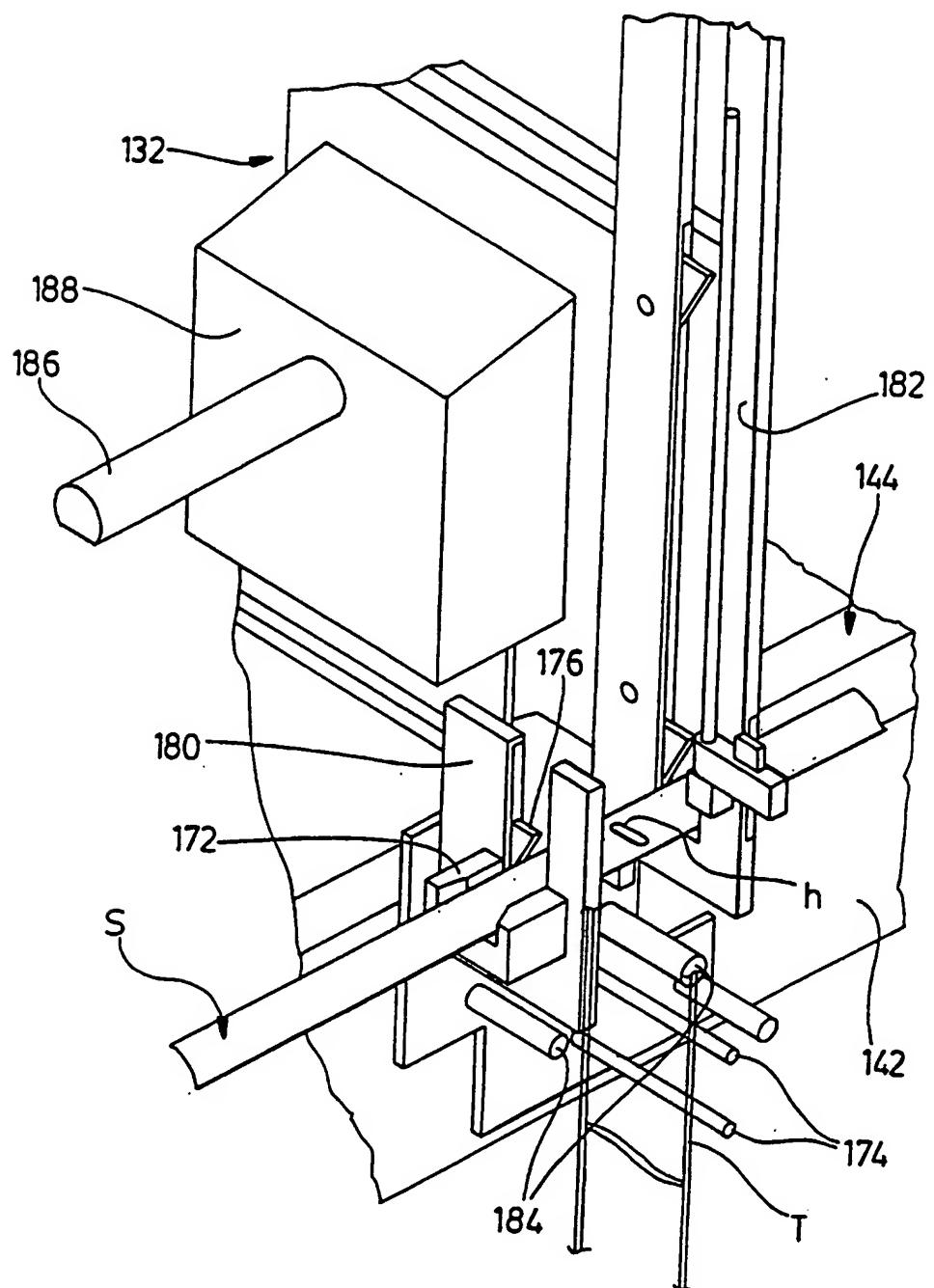


FIG. 11

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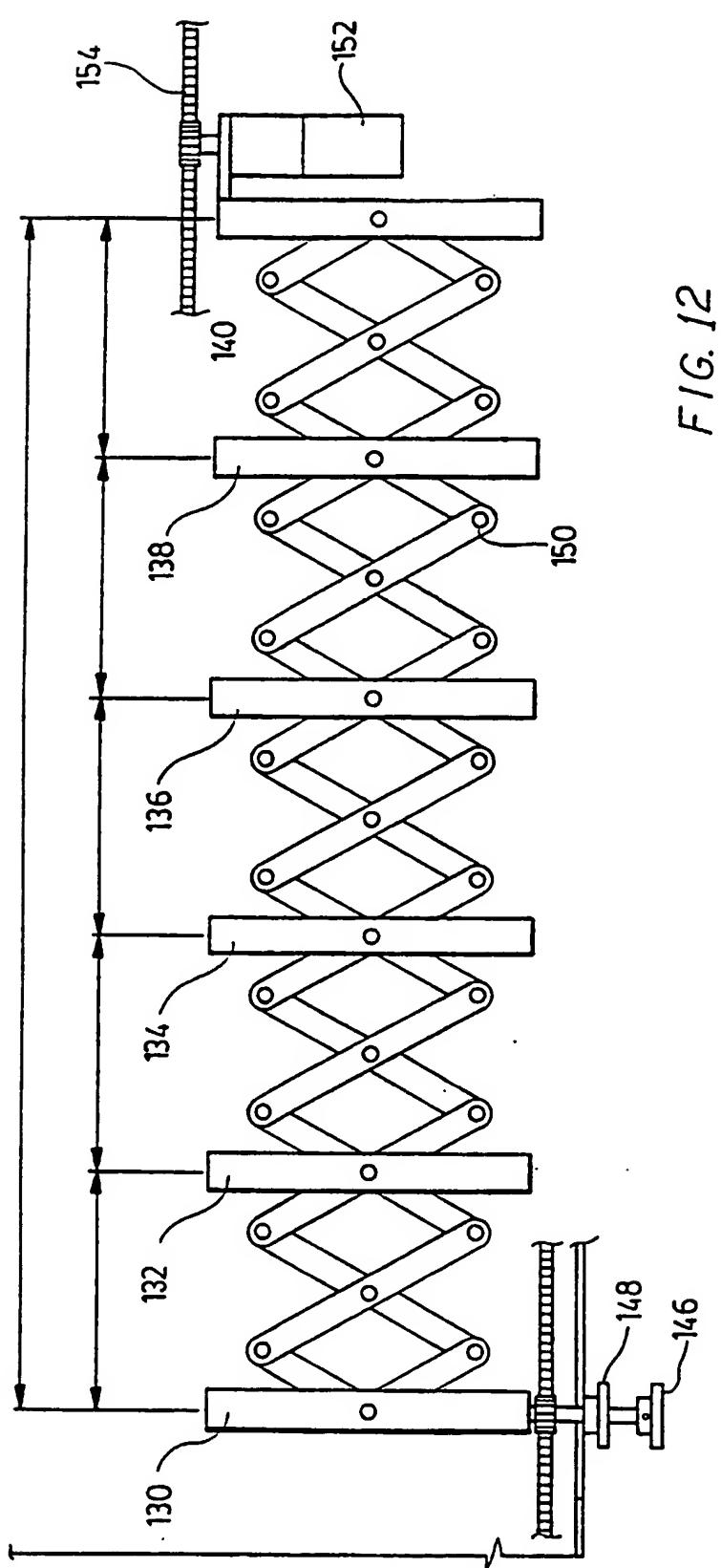
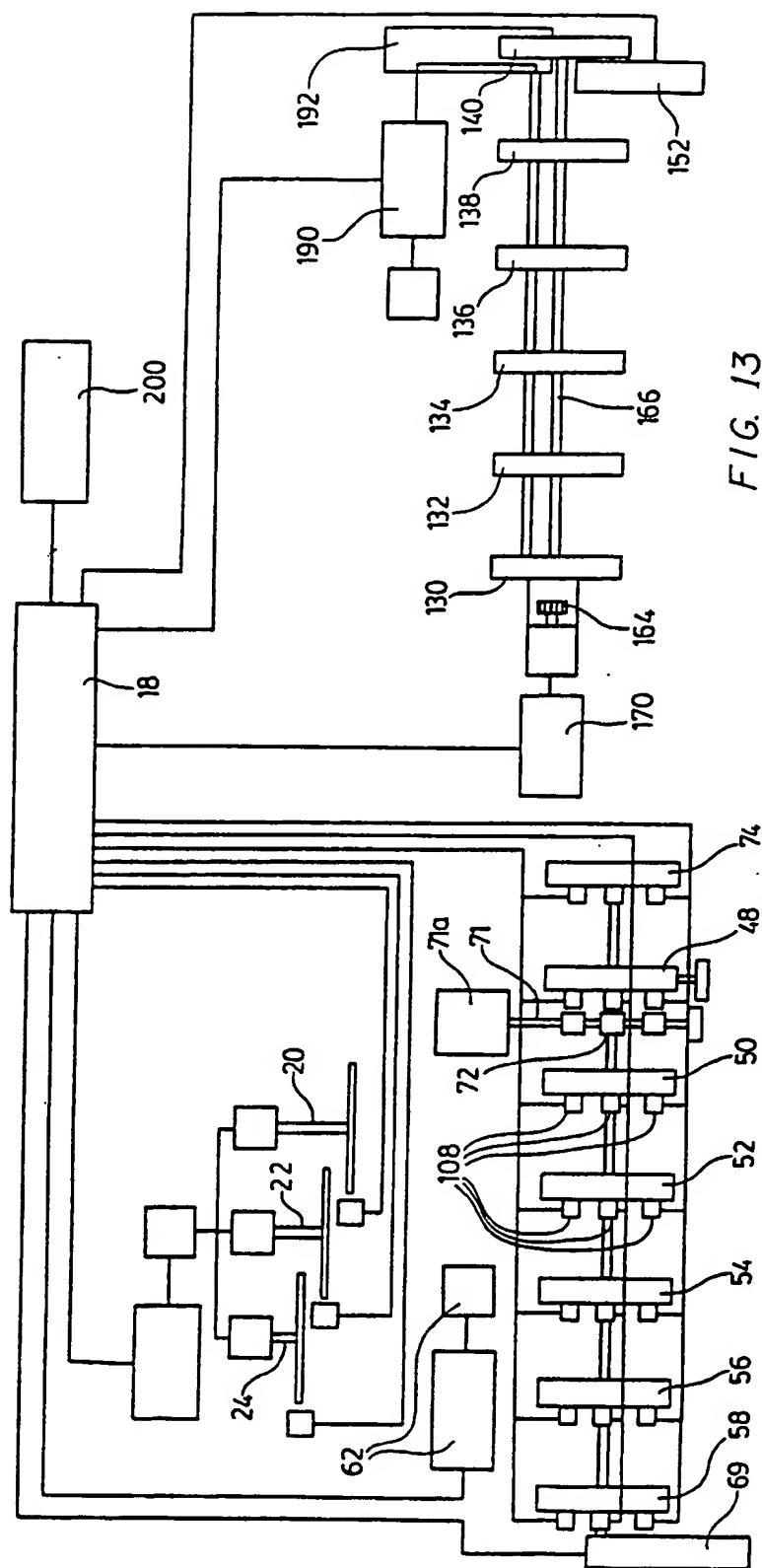


FIG. 12

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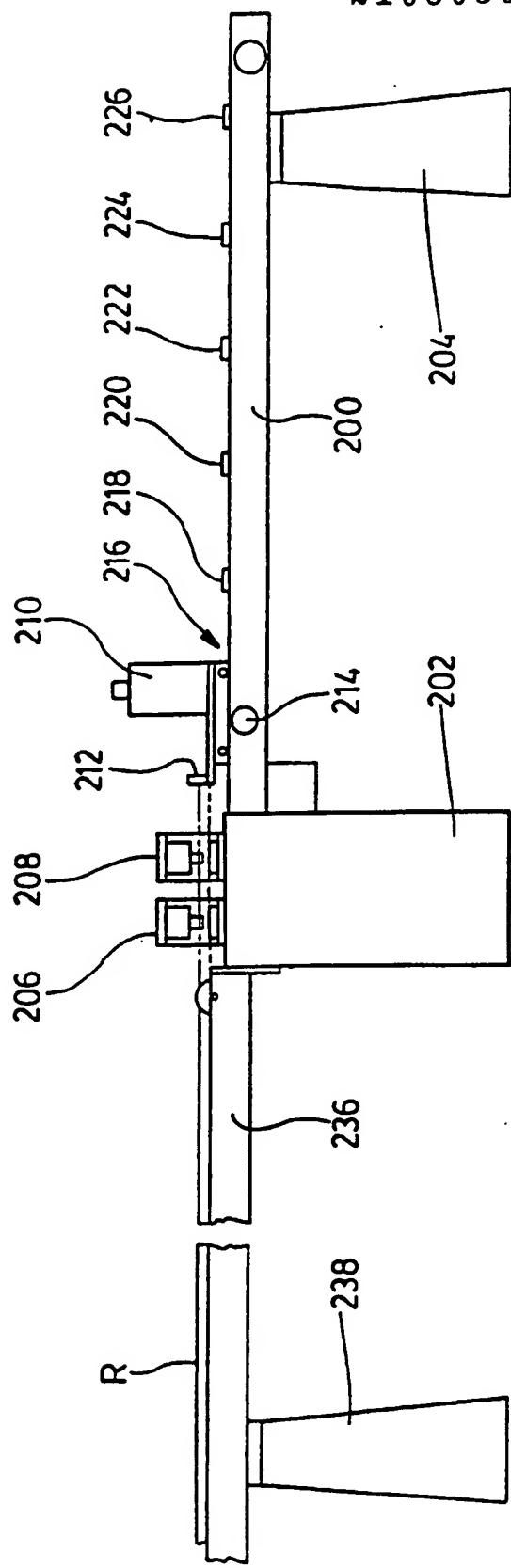


FIG. 14

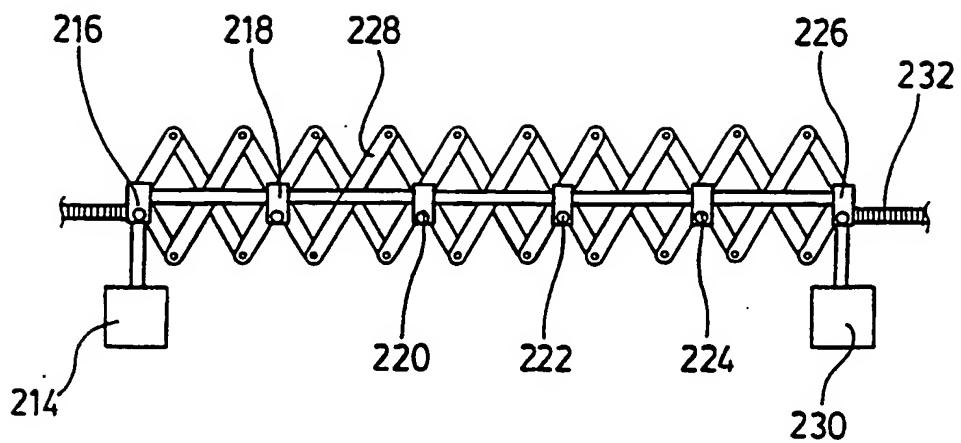
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FIG. 15

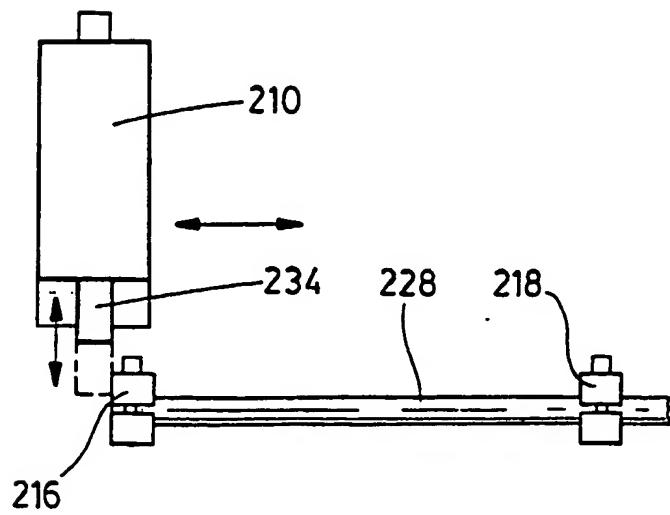


FIG. 16

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. Apparatus for the manufacture of blinds of the type having a headrail, a plurality of ladder tapes suspended from said headrail, a plurality of blind slats supported by said ladder tapes, and raise cord mean, passing through openings in said blind slats, whereby said blind slats may be drawn upwardly toward said headrail, and said apparatus comprising:
 - 5 die support means defining a predetermined axis for passage of strip material therealong for the formation of said blind slats;
 - 10 a plurality of die means mounted on said die support means, at least some of said die mean, being moveable therealong said die means being aligned with one another along said strip axis whereby a said strip of said material may pass therealong;
 - 15 scissors linkage means interconnecting said moveable die means, whereby movement of one of said moveable die means is communicated to all of the remaining said connected moveable die means such that each of said moveable die means moves a distance different than that moved by its adjacent said moveable die means, whereby at least selected ones of said moveable die means may be precisely positioned along said support means;
 - 20 die movement means for moving said one of said moveable die means;
 - die operating means operable to procure selective simultaneous operation of selected ones of said die means while leaving others of said die means inactive;
 - 25 die control means for selecting those said die means to be operated whereby to simultaneously form openings in said strip material at pre-selected spaced points therealong by simultaneous operation only of those said die means selected by said die control means;
 - 30 cut off die means for cutting off a pre-selected length of said strip material to form a said slat for a said blind, and,

slat threader means, located downstream of said die support means, for supporting said ladder tapes and defining a predetermined slat threading path for threading a said slat through said ladder tapes.

5 2. Apparatus as claimed in claim 1 wherein all of said die means are operable by a single common power operated means, and wherein said die control means is operable for selectively operating individual ones of said die means, through common power operated means.

10 3. Apparatus for the manufacture of blinds of the type having a headrail, a plurality of ladder tapes suspended from said headrail, a plurality of blind slats supported by said ladder tapes, and raise cord means passing through openings in said blind slats, whereby said blind slats may be drawn upwardly toward said headrail, and said apparatus comprising;

15 at least two strip material supply means;

 die support means defining an elongated pathway along a predetermined axis for passage of said at least two strips of strip material therealong for the formation of said blind slats from one or other of said at least two strips;

20 a plurality of die means mounted on said die support means, at least some of said die means being moveable therealong, said die means being aligned with one another along said pathway whereby said strips of said material may pass there-along side by side;

25 at least two punch dies associated with each of said die means mounted in side by side spaced apart relation for receiving respective said strips there-through;

 scissors linkage means interconnecting said die means, whereby movement of one of said moveable die means is communicated to all of the remaining said connected moveable die means such that each of said moveable die means moves a distance different from its adjacent said moveable die means, whereby at least

selected ones of said moveable die means may be precisely positioned along said support means;

die movement means for moving said one of said moveable die means;

die operating means operable to procure simultaneous operation of selected ones of said die means, and,

5 die control means for selecting certain of said at least two punch dies to be simultaneously operated thereby while leaving other of said punch dies inactive whereby to form simultaneous openings in a selected one of said at least two strips of said strip material at pre-selected spaced points therealong.

10

4. Apparatus as claimed in claim 3 including cut off die means for cutting off a pre-selected length of a selected one of said strips of said strip material to form a said slat for a said blind.

15

5. Apparatus as claimed in claim 4 including slat threader support means located downstream of said die support means, for supporting said ladder tapes and defining a predetermined slat threading path for threading a said slat through said ladder tapes.

20

6. Apparatus as claimed in claim 3 wherein all of said die means are operable by a single common power operated means, and wherein said die control means is operable for selectively operating individual ones of said die means, through common operating means.

25

7. Apparatus as claimed in claim 5 and including moveable mounting means connected to and supporting said threader means, and power operated movement means connected to said threader means, whereby said threader means may be moved with said mounting means between at least two predetermined positions relative to said axes of said at least two strip axes.

30

8. Apparatus as claimed in claim 1 and including moveable mounting means connected to and supporting said threader means, and power operated movement means connected to said threader means, whereby said threader means may be moved with said mounting means between at least two predetermined positions relative to said strip axis.

5

9. Apparatus for the manufacture of blinds of the type having a headrail, a plurality of ladder tapes suspended from said headrail, a plurality of blind slats supported by said ladder tapes, and raise cord means passing through openings in said blind slats, whereby said blind slats may be drawn upwardly toward said headrail, and said apparatus comprising;

10

die support means defining at least one predetermined axis for passage of strip material therealong for the formation of said blind slats;

15

a plurality of die means mounted on said die support means, said die means being aligned with one another along said at least one strip axis whereby a said strip of said material may pass therealong;

20

die operating means operable to procure operation of said die means, whereby to form openings in said strip material at pre-selected spaced points therealong;

25

slat threader means, located downstream of said die support means, for supporting said ladder tapes and defining a pre-determined slat threading path for threading a said slat through said ladder tapes; and,

moveable mounting means supporting said threader means, and power operated movement means connected to said threader means, whereby said threader means may be moved on said mounting means between at least two predetermined positions relative to said at least one predetermined axis of said die support means.

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10. Apparatus as claimed in claim 9 wherein there are a plurality of said die means, and at least some of said die means being moveable relative to others of

said die means and including linkage means interconnecting said moveable die means, whereby movement of one of said moveable die means is communicated to all of the remaining said connected moveable die means, and, die movement means for moving said linkage means.

5

11. Apparatus as claimed in claim 10 wherein said linkage means causes each of said moveable die means to move a distance different than that moved by its adjacent said moveable die means, whereby at least selected ones of said moveable die means may be precisely positioned along said support means, and thereby form openings in said strip material in desired locations.

10

12. Apparatus as claimed in claim 11 wherein all of said die means are operable by a single Common power operated means, and wherein said die control means is operable for selectively operating individual ones of said die means, through said common power operated means.

15

13. Apparatus for the manufacture of blinds of the type having a headrail, a plurality of ladder tapes suspended from said headrail, a plurality of blind slats supported by said ladder tapes, and raise cord means passing through openings in said blind slats, whereby said blind slats may be drawn upwardly toward said headrail, and said apparatus comprising;

20

at least two blind slat material supply means adapted to supply at least two strips of blind slat material along parallel spaced apart blind slat paths;

25

die support means defining at least two elongated pathways along at least two predetermined axes for passage of said at least two strips of slat material therealong parallel to one another for the formation of said blind slats from one or other of said at least two strips;

30

a plurality of die means mounted on said die support means in at least two groups on respective said paths at least some of said die means being moveable therealong, said die means in each said group being aligned with one another

along respective said pathways for receiving respective said strips of said material side by side in spaced apart relation;

die operating means operable to procure simultaneous operation of selected ones of said die means in respective said groups;

5 strip threader means, located downstream of said die support means, for supporting said ladder tapes and defining a predetermined treading path for threading a said strip through said ladder tapes;

moveable mounting means supporting said threader means whereby said threader means may be aligned with a selected one of said strip paths; and,

10 power operated movement means connected to said threader means, whereby said threader means may be moved on said mounting means between at least two predetermined positions.

14. Apparatus as claimed in claim 13 wherein there are three said blind strip
15 material support means supplying three said strips of blind slat material along parallel spaced apart paths, and wherein there are three groups of said die means defining three said paths.

15. Apparatus as claimed in claim 14 wherein said threader means is moveable
20 between said three paths.

16. Apparatus for the manufacture of blinds of the type having a headrail, a plurality of blind slats supported by said ladder tapes, and raise cord means passing through openings in said blind slats whereby said blind slats may be drawn upwardly toward said headrail, and said apparatus comprising;
25

die support means defining a predetermined axis for passage of strip material therealong for the formation of said blind slats;

a plurality of die means mounted on said die support means, at least some of said die means being moveable therealong, said moveable die means including a first moveable die means, and a plurality of subsequent moveable die means
30

said die means being aligned with one another along said axis whereby a said strip of said material may pass therealong;

first moveable die movement means connected to said first moveable die means and operable to move said first moveable die mean, a first predetermined distance;

means interconnecting said first moveable die means and its next adjacent said subsequent moveable die means;

respective further moveable die connection means connecting between respective further subsequent moveable die means in series whereby movement of said first moveable die means for said first predetermined distance caused by said first moveable die movement means is communicated to all of said subsequent moveable die means such that each of said moveable die means moves a distance different than that moved by its adjacent said moveable die means, whereby at least selected ones of said moveable die means may be precisely positioned along said support means;

die operating means operable to procure selective simultaneous operation of selected ones of said die means while leaving others of said die means inactive;

die control means for selecting those said die means to be operated whereby to form openings in said strip material at preselected spaced points therealong by operation only of those said die means selected by said die control means;

cut off die means for cutting off a preselected length of said strip material to form a said slat for a said blind, and,

slat threader means, located downstream of said die support means, for supporting said ladder tapes and defining a predetermined slat threading path for threading a said slat through said ladder tapes.

17. Apparatus as claimed in claim 16 including scissors linkage means interconnecting said moveable die means, whereby movement of said first

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moveable die means is communicated to all of the remaining said connected moveable die means through said scissors linkage means.

18. Apparatus as claimed in claim 16 wherein all of said die means are
5 operable by a single common power operated means, and including control
means for selectively operating individual ones of said die means, through the
medium of said common power operated means.

10 19. Apparatus as claimed in claim 16 and including moveable mounting means
supporting said threader means whereby said threader means may be moved
relative to said strip axis.

15 20. Apparatus for the manufacture of blinds of the type having a headrail, a
plurality of ladder tapes suspended from said headrail, a plurality of blind slats
supported by said ladder tapes, and raise cord means passing through openings
in said blind slats, whereby said blind slats may be drawn upwardly toward said
headrail, and said apparatus comprising;

20 die support means defining an elongated pathway along a predetermined
axis for passage of at least two strips of strip material therealong for the for-
mation of said blind slats;

a plurality of die means mounted on said die support means, at least some
of said die means being moveable therealong, said die means being aligned with
one another along said pathway whereby said strips of said material may pass
therealong side by side;

25 a die operating shaft in each of said die means operable to procure
operation of said die means;

at least two perforation dies associated with each of said die means in
spaced apart relation for receiving respective said strips therethrough;

30 at least two perforation die operating members for each said die means,
for operating respective perforation dies;

at least two activator means, one for each respective said operating member, whereby one of said activator means may activate one said operating member, while leaving the other said operating member inactive;

5 control means for selecting certain of said perforation dies to be operated whereby to form openings in a selected one of said strips of said strip material at preselected spaced points therealong, and,

cut off die means operable to cut off a length of said strip to form a said slat.

10 21. Apparatus as claimed in claim 20 including slat threader support means, located downstream of said die support means, for supporting said ladder tapes and defining a predetermined slat threading path for threading a said slat through said ladder tapes.

15 22. Apparatus as claimed in claim 21 and including moveable mounting means supporting said threader means whereby said threader means may be moved relative to said axes of said at least two strip axes.

20 23. Apparatus as claimed in claim 21 wherein there are a plurality of said die means, and at least some of said die means being moveable relative to other of said moveable die means and including linkage means interconnecting said moveable die means, whereby movement of one of said moveable die means is communicated to all of the remaining said connected moveable die means and die movement means for moving said linkage means.

25 24. Apparatus as claimed in claim 20 wherein there are a plurality of said die means, and at least some of said die means being moveable relative to others of said die means and including linkage means interconnecting the same, whereby movement of one of said die means is communicated to all of the remaining said connected moveable die means.

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25. Apparatus as claimed in claim 24 wherein said movement connection means causes each of said die means to move a distance different from its adjacent said die means, whereby at least selected ones of said die means may be precisely positioned along said support means, and thereby form openings in said strip material in desired locations.

5

26. Apparatus as claimed in claim 25 wherein all of said die means are operable by a single common power operated means, and including control means for selectively operating individual ones of said die means, through the medium of said single common operating means.

10

27. Apparatus as claimed in claim 23 wherein said linkage means causes each of said moveable die means to move a distance different from the distance moved by its adjacent said moveable die means, whereby at least selected ones of said moveable die means may be precisely positioned along said support means, and thereby form openings in said strip material in desired locations.

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28. Apparatus as claimed in claim 23 wherein all of said die means are operable by a single common power operated means, and wherein said die control means is operable for selectively operating individual ones of said die means, through said common power operated means.

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